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Determination of attitudes of students teachers towards the utilization of technology: creating a technology tree

A.Seda YÜCEL[a]*, Canan KOÇAK[b]

Faculty of Education Department of Chemistry Education, Hacettepe Universty, Beytepe, Ankara 06800, Turkey

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Abstract

This study involves an alternative statistical evaluation process of an assessment tool, which had previously been evaluated through factor analysis, regarding determination of the attitudes of student teachers, who receive education in Turkey, towards the utilization of technology. The previously prepared 50 items were evaluated in this study according to the Classification Tree method, which is one of the multi-variable statistical analysis methods. A classification of 31 leaves was created. All 31 items of the obtained Technology Tree reflected the positive and negative attitudes of student teachers of chemistry towards the utilization of technology as well as their technological consciousness. Additionally, the researchers emphasize that such a scale would serve as a guiding tool that could be applied to other groups with other social status and classes.

Keywords: Technology tree; attitudes; technology.

1. Introduction

Technological developments lead to changes in all fields of social life. The development of a society depends on its levels of producing and making use of the scientific knowledge. What provides knowledge production is a well-equipped human power, which leads to the turning of scientific knowledge into technology and its utilization. Therefore; technology today should be considered as a field that covers all social and financial effects that enable the integration of the scientific knowledge into real life. In this way, the scientific knowledge serves at the development of technology and the developing technology contributes to new inventions. It would be possible to facilitate from the developing technology and keep up with the 21st century by bringing up individuals who are aware of the technological developments and understand its importance in personal and social life. The training of teachers, who play the most effective role in understanding the conceptual aspect of technology as well as the utilization of developing technologies, is as important as equipping the educational institutions with technology. It is not enough to introduce people, who would serve at the utilization of technology in life, with the technological

* A.Seda YÜCEL. Tel.: 0 312 297 67 83; fax: 0 312 297 86 00.
E-mail address: aseda@hacettepe.edu.tr.

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developments only. Teachers should attain the skills to organize teaching activities by utilizing technology and modern teaching techniques [6]. There is a lot of research on teachers' utilization of technology. These studies concluded that the teachers do not have the adequate knowledge in terms of computer literacy [2]. They were also determined not to have received enough training on utilizing computers or other technological tools. The student teachers were determined not to have positive attitudes towards the importance of the utilization of technology in science. Additionally, there are many studies that displayed the fact that in teacher training institutions, student teachers were not competent at the utilization of technology [3,5]. Moreover, it was found that the negative attitudes of institutions towards the technology also affected the attitudes of student teachers negatively [1].

It has become an obligation for the teachers to utilize new technologies since the computers and other technological tools enable the organization of teaching environments, which fit to the levels of the students. This study has a perspective that student teachers and teachers have to have positive attitudes towards technology, keep up with the reformations in of the age in terms of technology utilization and continuously update their knowledge.

2. Problem

"How could the attitudes of student teachers of chemistry towards the utilization of technology be classified? Could technology classification scale serve as a guiding tool or a performance evaluator by the classification of the attitudes in different dimensions?"

3. Purpose

This research was conducted with a group of 162, consisting of student teachers of chemistry at university during the 2005-2006 academic year. The study sought the answer to the question how the attitudes of student teachers of chemistry towards the utilization of technology could be classified Moreover, the role of the scale, which was reevaluated through classification, was investigated in terms of serving as a guiding tool and a performance evaluator.

4. Assumptions

Student teachers responded to the statements in the technological attitude scale sincerely.

5. Method

The study consists of the organization of the technological attitude scale of 50 items, which had previously been prepared as a single dimensional 5 point Likert-type scale [11], according to the classification tree method, which is a statistical technique. The 50 items of the scale were evaluated according to the classification tree technique with the Statistica Version 6 software. The statistical analysis using the software concluded with a classification tree with 31 leaves. The classification tree technique was utilized as one of the multi-variable statistical analysis techniques that provide best results, because; the scale was previously prepared according to the Likert type [8]. The number of samplings in the study was not changed. As a result of the application of this technique, the existing 50 items displayed on Table 1 were classified as the 31 statements displayed in Figure 1. This classification was named as the Technology Tree. The numbers in all nodes in the technology tree show the node numbers. The number on the blue line going from one node to another node displays the number of individuals classified from the parent node to the child node. Red nodes indicate the leave nodes and the blue nodes indicate the parent or child nodes.

6. Limitations

The research is limited to the determination of technology utilization and awareness levels of the 162 student teachers at Hacettepe University, which is located in the capital of Turkey, Ankara.

7. Findings

The items of the Scale of Attitudes towards Technology Utilization are displayed in Table 1. The classification called the Technology Tree that involves the evaluation of these items according to the Classification Tree method, which is a statistical analysis technique, is displayed in Figure 1.

Table 1. The items on the Technology Tree

	I totally agree	I agree	Undecided	I don't agree	I totally disagree
1. Daily and yearly plans should be prepared by teachers using computers.					
2. Teachers do not need to use computers for preparation.					
3. Lessons should often include computer-assisted instruction.					
4. Technological tools do not need to be used in instruction.					
5. Students should do their homework on computers using the Internet.					
6. Using computers do not have any benefits for students in education.					
7 Teachers should receive regular in-service training on new Technologies.					
8 Students should get advance information on the usage of new Technologies.					
9. The usage of new technologies in teacher training should be increased.					
10. Learning is more permanent through television since it is both visual and auditory.					
11. Using television with printed materials has no effects on education.					
12. Through distance learning via television a wide range of people could be reached.					
13. Because the videotapes could be watched again, students could get feedback.					
14. Recording some parts of the lesson on videotapes could provide the students the opportunity to see their mistakes.					
15. Computer-assisted education should be teacher-centered.					
16.A minimum level of computer knowledge is enough to reach knowledge via the Internet.					
17. On the internet, one could reach unlimited information on any subject.					
18. Some experiments that are difficult or dangerous to do could be taught through computer-assisted instruction.					

19. Foreign languages could be practiced through the computers or the Internet.

20. Computer-assisted instruction increases students' achievement.

21. Using technological tools does not affect students' motivation.

22. E-mail is only for communication; it cannot be used in education.

23. OHP, slides and projection should not be preferred as they take too much time to be used.
24. Technological tools could be used for practice or revision.

25. Advanced knowledge is needed in order to be able to use computers.

26. Technological tools could only succeed when they address all the sense organs.

27. Students should receive basic education on computer literacy.

28. Teaching could reach its goal only together with technology.

29. Teaching abstract concepts could be more concrete through using technology.

30. Using the Internet in the learning process is a waste of time.

31. All University students must be able to use certain software such as Word and Excel.
32. Being given homework that requires computer usage puts me in stress.

33. If I were to give a seminar, I would prefer using OHP or PowerPoint to using chalk and board.
34. I believe that the information technology usage is not adequate in Turkey.

35. One does not have to use technological facilities in order to be successful in life.

36. I believe that using various appropriate technological environments could avoid waste of time in education and teaching process.
37. In order to use the technological facilities, one should know at least on foreign language.
38. Technological facilities have a positive effect on productive studying and learning.

39. Using technology would facilitate the understanding of difficult subjects.

40. Using current Technologies would promote the improvement of new ones.

41. While determining the aims of a lesson plan, the technological age in education should be considered.
42. Using technology wastes the thinking potential of a human away.

43. Turkey should have a technology policy.

44. Using technology in an ethical environment should be a part of national aims.

45.In order to be able to graduate from the University, the ability to "use the technological materials of the field" should be rated.

46. I believe that academic staff is inadequate in using technology.

47. Technological changes should be considered when experiencing periods of change.
48. A life full of technology may also affect an individual in a negative way.

49. When technology is mentioned, the first things I think of are using computers and multimedia.
50. When technology is mentioned, the first things I think of are using tools and fixing them.

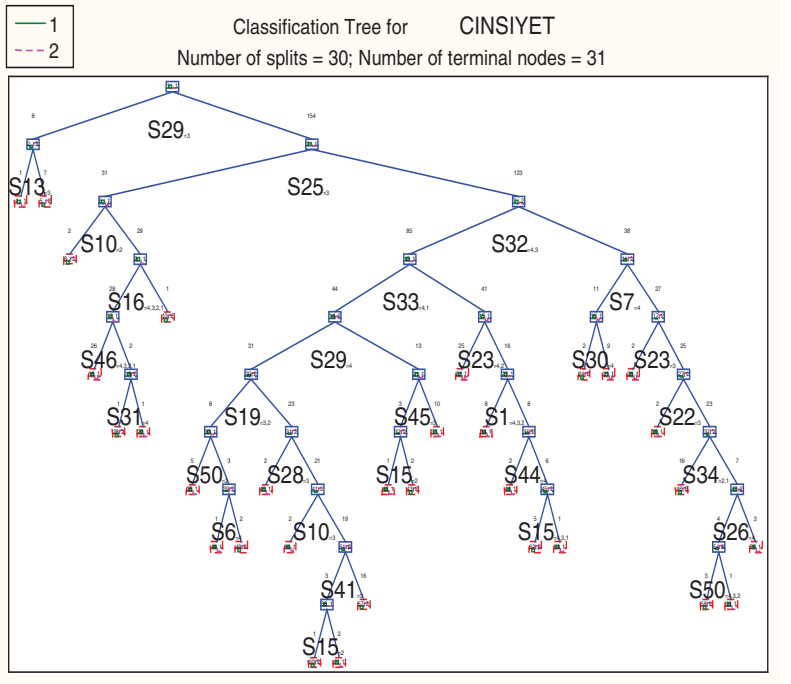

Figure 1. The technology tree

The ideas of the items that formed the Technology Tree indicate and classify the positive and negative attitudes of student teachers towards the utilization of technology. The idea of the item 29, "teaching abstract concepts could be more concrete through using technology", shows that the student teachers have positive attitudes towards the utilization of technology. Since this item forms the root of the tree, it gives an idea to the researchers that the positive attitude score of this item is rather high.

The root item creates the body through the two branches that indicate the two basic perspectives. The body (trunk) of the Technology Tree divides into its branches with a curve that bring forward two different perspectives. The two major points of the body give a subjective and objective perspective to the utilization of technology. The items that bring an objective perspective to the utilization of technology are items 29, 13, 10, 16, 46 and 31. These also represent the branches and leaves of the tree. That is, the ones that have objective perspectives for the utilization of technology display an attitude that covers all ideas limited to the scale. In the branching group of the tree which is mostly objective, the student teachers were found to be in an attitude that they did not reflect what should be regarding the utilization of technology but they reflected the general opinions of the society. Shortly, the student teachers in this group had a common perspective of the utilization of technology. This conceptual perspective also reflects the objective perspective towards the utilization of technology. In the same way, the student teachers that had subjective perspectives for the utilization of technology cumulated around the 29th, 25th, 32nd, 33rd and 7th items with ideas that reflect the same opinions from the beginning to the end. The student teachers with ideas that formed the branching in the group have anxieties towards the utilization of technology (items 25 and 32). They

were willing to utilize technology but they were in negative attitudes because of the perspectives of their instructors. For instance, the item 7, "Teachers should receive regular in-service training on new technologies" indicate that the student teachers have positive attitudes towards being aware of and guided about the technological developments technologies through in-service training courses. The 30th, 23rd, 22nd, 34th, 26th and 50th items that form the branches of item 7 show the negative attitudes towards not having adequate knowledge on the utilization of technology. Therefore; it is not surprising that the 7th item had such branches with statements that reflect negative attitudes. Another branching observed in the technology tree is though to display the opinions in two different dimensions. The group of 33rd, 23rd, 1st, 44th and 15th items consist of ideas that emphasize the importance of the utilization of technology in education. Moreover, the student teachers displayed positive attitudes towards the things that teachers should consider regarding the utilization of technology and they were also carrying positive attitudes towards the development of an educational policy regarding the utilization of technology (item 44). In another branching starting from the 33rd item involves positives attitudes towards how the utilization of technology contributes to the individuals and students (items 33-29-19-45-50-28-10 and 41). Therefore, the 33rd item adds a value to the tree with its characteristic that displays the social aspects of the technology utilization awareness and with its condition that reflects two different dimensions involving positive attitudes. The 50th, 6th and 42nd items are the leaves that reflect the negative attitudes of student teachers, which are thought to stem from their being incompetent at the utilization of technology. Since they are the nodes that are located in the outer leaves of the tree, they do not need to be of too much attention.

8. Conclusion

As a result, the "Technology Tree", which is suggested as a valid assessment tool after its evaluation, contributed to this study with 31 items with node characteristics. These 31 items reflect the positive and negative attitudes of student teachers towards technological awareness and the utilization of technology, and classify these attitudes as well. Moreover, the Technology Tree, through classifying the attitudes of the student teachers of chemistry towards the utilization of technology displays the directions of the attitudes of the student teachers as well. In other words, this classification shows the dimensions of the attitudes of the student teachers and gives clues on what kind of applications should be done in order to enable the development of positive attitudes. Additionally, the researchers emphasize that in case the necessary organizations are made, such a scale would serve as a guiding tool that could be applied to all groups of different social status and classes.

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